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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/702,646	11/07/2003	Tetsuro Tojo	244779US3	3064

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EXAMINER	
DINH, BACH T	

ART UNIT	PAPER NUMBER
1724	

NOTIFICATION DATE	DELIVERY MODE
07/07/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/702,646	Applicant(s) TOJO ET AL.	
	Examiner BACH DINH	Art Unit 1724	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 April 2011.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 04/29/2011 has been entered.

Summary

2. This is the response to the communication filed on 04/29/2011.
3. Claims 1-9 remain pending in the application.
4. The application is not in condition for allowance.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

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2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
7. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tojo et al. (WO 01/77412) with equivalent English translation provided by Tojo et al. (US 6,818,105) in view of Saito et al. (US 6,383,300).

The recited limitations “an inert gas substitution means for” of claims 1, 4 and 6 and “a detecting means for” in claim 2 and 7 invoke 35 U.S.C. 112, sixth paragraph. According to the specification, the inert gas substitution means includes the inert gas feeding line 91, the inert gas storage tank 92, the second automatic valve 73, the first automatic valve 74, and an HF feeding interruption detecting means (see specification on page 6). According to the specification, the first level sensing means 5 and the second level sensing means 6 constitutes the HF feeding interruption detecting means (see specification on page 9).

Addressing claims 1, 4 and 6, Tojo discloses a fluorine gas generator for generating fluorine gas by electrolyzing an electrolyte comprising a hydrogen fluoride containing mixed molten salt (col. 14 lines 22-25 or 14:22-25), which generator is equipped with:

A hydrogen fluoride gas feed line (figure 3, HF supply line, 10:64), one end of which is connected to a hydrogen fluoride gas supply source (10:53, the hydrogen fluoride gas is continuously fed; therefore, it is inherent that the hydrogen fluoride gas supply line is connected to a hydrogen fluoride gas supply source) and the other end of which is connected to a hydrogen fluoride gas inlet disposed in an electrolyte in the electrolyte bath (in figures 3-4, the HF supply line has one end or the inlet disposed in the

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electrolyte 3 in the electrolytic bath; furthermore, in 10:44-48, the HF gas is bubbled in the molten salt; therefore, it is implicitly disclosed that the inlet of the HF supply line is disposed in the electrolyte), for feeding hydrogen fluoride gas into the electrolyte as required by claim 1 and the electrolytic bath as required by claims 4 and 6,

A first automatic valve disposed on the hydrogen fluoride gas feed line (10:60-65, solenoid valve) and capable of being closed on the occasion of interruption of hydrogen fluoride gas feeding (10:65-11:11, the solenoid valve is automatically closed; therefore, the valve is capable of being closed on any occasions including the occasion of interruption of hydrogen fluoride gas feeding).

Tojo further discloses an inert gas tank 18, inert gas feed line, a plurality of valves and liquid level probes 8 and 9 for equalizing the pressure between the anode and cathode chambers in the event of pressure fluctuation due to the clogging of the fluorine gas line or the hydrogen gas line (9:7-10:11, figures 1-6) and in order to prevent possible back flow of the electrolytic bath (3:2-4). Additionally, Tojo discloses that during pressure fluctuation, the feeding of HF gas is interrupted by closing the solenoid valve (10:57-11:11); thus, Tojo already contemplates the limitation "substituting an inert gas therefor on the occasion of interruption of hydrogen fluoride gas feeding in order to prevent a negative pressure in the hydrogen gas feed line", which is resulted from the back flow of the electrolytic bath (3:2-4). This is evidenced from the disclosure in 9:20-51 and figure 3, where the clogging of the fluorine gas line causes pressure in the anode chamber 5 to decrease and the pressure in the cathode chamber 7 to increase, which pushes more electrolyte to the HF feed line as seen in figure 3. Subsequently, inert gas is introduced

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in order to decrease the liquid electrolyte level in the cathode chamber to match that of the anode chamber. Moreover, Tojo recognizes that HF gas is corrosive (8:1-5).

Tojo is silent regarding an inert gas substitution means for eliminating the hydrogen fluoride gas remaining in at least part of said line on the side downstream from the first automatic valve on said hydrogen gas feed line while the hydrogen fluoride gas inlet is disposed in the electrolytic bath, which part is located downstream from said first automatic valve and upstream of said hydrogen fluoride gas inlet because the only difference between the disclosure of Tojo and that of current claims is the inert gas feed line being directly connected to the hydrogen fluoride gas feed line.

Saito discloses a heat treatment apparatus; wherein, inert nitrogen gas is used to purge the apparatus by opening valves VB3 and VB3 while closing other valves (13:53-62).

Furthermore, the inner nitrogen gas feed lines is connected to the N₂ gas source 36a and connected to the reactive gas feed line at a location downstream from the automatic valve VB1 (figure 1).

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the fluorine gas generator of Tojo by connecting the inert gas feed line directly to the reactive HF feed line downstream of solenoid valve like that of Saito because introducing inert gas directly to the HF feed line downstream from the solenoid valve purges the HF feed line of corrosive gas (HF is corrosive, Tojo, 8:1-5) as well as preventing back flow of the electrolyte by equalizing the pressure between the anode chamber 5 and the cathode chamber 7 when the pressure of the cathode chamber 7 decreases as shown in figure 3 of Tojo. Furthermore, combining the known inert gas

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feed line directly to the known HF reactive feed line according to the known method disclosed by Saito to achieve the predictable result of equalizing the pressure of the cathode and anode chambers in the fluorine generator in the event of pressure decrease in the cathode chamber is a matter of obviousness (rationale A, KSR decision, MPEP 2141). Regarding the recited limitation "substituting an inert gas thereof in case of emergency in the fluorine gas generator" of claim 4, Tojo discloses when the electrolysis is halted or in case of emergency, the apparatus is purged (9:43-45). Therefore, the disclosure of Tojo reads on the limitation recited above of instant claim.

Regarding the recited limitation "substituting an inert gas thereof in case the first automatic valve is closed" of claim 6, Tojo discloses the level probes 8 and 9 halt electrolysis when they detect a fluctuation limit (7:12-14) and purge the apparatus with inert gas when the electrolysis is halted (9:37-51). Furthermore, Tojo discloses the liquid level probe (liquid level probe disclosed in 11:2-10) detects fluctuation in the cathode chamber and sends out a signal to close the solenoid valves when such scenario occurs (11:2-11). Therefore, Tojo discloses when a fluctuation occurs, electrolysis is halted, the solenoid valve on the HF feed line is automatically closed and the whole system is purged with inert gas, which meets the above limitation of current claim.

Addressing claims 2, 5 and 7, Tojo discloses liquid level probes 8 and 9 which constitute the claimed "a detecting means for detecting interruption of feeding of the hydrogen fluoride gas". Tojo further discloses a second automatic valve (solenoid valve 54, figures 3-4) disposed on the inert gas feed line and operated in association with the detecting

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means to feed the inert gas (7:18-27, the solenoid valve 54 is opened or closed in accordance with the detection results obtained from the level probes 8 and 9). Tojo discloses an inert gas storage tank 18 (figure 1) for storing the inert gas to be fed. Saito discloses the inert gas feed line is provided for feeding the inert gas to the reactive gas feed line on the side downstream from the automatic valve VB1 (figure 1, the inert gas feed line is connected to the reactive gas feed line on the side downstream from the automatic valve VB1); the inert gas feed line further comprises a second automatic valve VB3 and operated in association with the automatic valve VB1 to feed the inert gas into the reactive gas feed line on the side downstream from the automatic valve VB1 (11:52-59, after the completion of the film, VB1 and VB2 are closed; 12:40-49 and 13:53-62, VB3 and VB4 are opened when all the other valves are closed in order to purge the system).

In conjunction with the rejection of claims 1, 4 and 6, the modified apparatus of Tojo with the connectivity of Saito would have the inert gas feed line connected to the HF feed line on the side downstream from the solenoid valve (solenoid valve disclosed in 10:57-65) and the automatic valve 54 of the inert gas feed line operates in association with the level probes 8 and 9 to feed inert gas into the HF feed line on the side downstream from the solenoid valve (7:18-27, the solenoid valve 54 is opened or closed in accordance with the detection results obtained from the level probes 8 and 9; therefore, when the solenoid valve 54 is opened, inert gas would be fed into the HF feed line on the side downstream from the solenoid valve).

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Addressing claims 3, 8 and 9, Tojo discloses an inert gas storage tank 18 (figure 1) for storing the inert gas to be fed.

Response to Arguments

8. Applicant's arguments filed 04/29/2011 have been fully considered but they are not persuasive for the following reasons. Firstly, the discussed modification does not call for the replacement of the pressure equalization system of Tojo but a simple addition of the inert gas feed line to the HF gas feed line downstream of solenoid valve in the manner disclosed by Saito and such modification is well within the technical grasp of one with ordinary skill in the art considering similar connections are made by Tojo as shown in figure 1. Secondly, although it is recognized that the fluorine gas generator of Tojo is capable of equalizing the pressure between the cathode and anode chambers without the connection in the discussed modification; however, Tojo also recognizes the corrosive nature of the HF; therefore, the discussed connection not only supplement the pressure equalization process as desired by Tojo but also purge the HF feed line of corrosive HF gas. For the reasons above, Examiner maintains the position that claims 1-9 are obvious over the combined disclosures of Tojo in view of Saito.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BACH DINH whose telephone number is (571)270-5118. The examiner can normally be reached on Monday-Friday EST 7:00 A.M-3:30 P.M.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keith Hendricks can be reached on (571)272-1401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BD
06/30/2011

/Keith D. Hendricks/
Supervisory Patent Examiner, Art Unit 1724